

A haptic control framework for end-effector based gait simulation interfaces and its application in patient-adaptive rehabilitation training

The use of robots to assist therapy of neurological motor disfunctions, such as limited mobility, is an emerging research field. This book provides the first systematic application of a haptic control framework and assist as needed training paradigms to so called end-effector based gait simulation interfaces with a natural walking workspace, which fully carry the operator's bodyweight. The developed haptic control framework provides a unified controller architecture and a design method based on robust adaptive control. Thus it allows for the stable interaction with virtual training environments. The modular virtual environments combine a walking scenario with an adjustable assistance along the desired training motion. The framework is the basis to develop and implement compliant and patient-adaptive training strategies and, more generally speaking, haptic interaction on end-effector based gait interfaces. The prototype was successfully implemented and tested on the walking simulator HapticWalker.



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